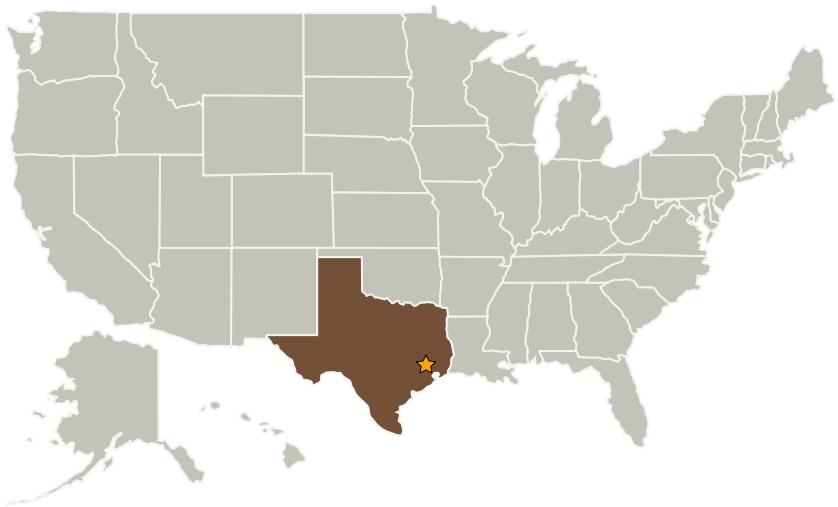
Non-Invasive Transcranial Doppler Sonogram Device for Detection of Embolic Air in Cerebral Arteries, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

Technology is needed to provide real-time assessment and evaluation of hematological parameters during prolong space flights and planetary missions. A key hematological parameter is the monitoring and measurement of emboli in the brain especially during Extra-Vehicular Activity (EVA) on planetary surfaces as well as orbital flights. A non-invasive, compact Transcranial Doppler (TCD) measurement device will provide monitoring of flight crew blood physiology during extended duration missions and deliver this data to onboard flight surgeons. To address this need, GeneXpress Informatics (GXI) and Leonid Bunegin and Dr. Claudia S. Miller of the University of Texas Health Science Center (UTHSC) at San Antonio proposes to develop a non-invasive, portable TCD sonogram based diagnostic system for real-time monitoring and detection of cerebral artery air embolisms. The detection system uses intensity audio signals and Fast Fourier Transform (FFT) analysis to detect and locate the TCD audio signals of air bubbles in the middle cerebral artery (MCA). In Phase I, GXI proposes to develop and demonstrate the non-invasive use TCD measurements for the determination of air emboli. In Phase II, GXI will proceed to a prototype development which will include construction and fabrication of a handheld field portable frequency-domain TCD measurement system.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Genexpress Informatics, Inc.	Supporting Organization	Industry	Austin, Texas

Primary U.S. Work Locations
Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Robert Chin

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.8 Measurement and Control